

UNCLASSIFIED

AD 419197

DEFENSE DOCUMENTATION CENTER

FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION, ALEXANDRIA, VIRGINIA



UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

64-5-
Abstract for American Physical Society, New York Meeting, January 28-31, 1959.

6
A New Class of Ferroelectrics: Acid Selenites:* R. Pepinsky, K. Vedam,

Y. Okaya and F. Unterleitner, The Pennsylvania State University. —

Optical observation of a reversible transition in potassium acid selenite has led to the dielectric examination of other acid selenites. Two new ferroelectric species have therewith been discovered: $\text{LiH}_3(\text{SeO}_3)_2$, ferroelectric at room temperature; and $\text{NaH}_3(\text{SeO}_3)_2$, ferroelectric below -75°C .

$\text{LiH}_3(\text{SeO}_3)_2$ shows well-saturated square hysteresis loops over the temperature range from -190°C to $+80^\circ\text{C}$. At room temperature the spontaneous polarization is 10.0 microcoulombs/cm², and the coercive field is 1.5kv/cm. X-ray observations reveal monoclinic symmetry, space group Pn, with $a = 6.255 \text{ \AA}$, $b = 7.899 \text{ \AA}$, $c = 5.443 \text{ \AA}$, $\beta = 105^\circ 23'$. The polar axis is perpendicular to the (001) plane. The material appears to be of practical importance.

$\text{NaH}_3(\text{SeO}_3)_2$ is not isomorphous with $\text{LiH}_3(\text{SeO}_3)_2$. In the room-temperature phase the symmetry is monoclinic, space group $\text{P2}_1/\text{a}$, with $a = 11.77 \text{ \AA}$, $b = 4.84 \text{ \AA}$, $c = 5.80 \text{ \AA}$, $\beta = 118.5^\circ$. The ferroelectric phase has triclinic symmetry (space group P1; if axes are denoted as for room-temperature phase, space group C1). The polar direction is along [310], referred to the monoclinic phase.

*Research supported by Air Force Office of Scientific Research (ARDC), Signal Corps Engineering Laboratories, and Atomic Energy Commission.